What is claimed is:

1. An optical fiber comprises a core having lightwave guide property and extending along one direction,

a clad layer covering over a peripheral surface of said core to make a light transmitted in said core shield within said core,

a scintillator material dispersed in said clad layer and emitting light when radiation is applied, wherein at least a part of the light emitted when radiation is applied to said scintillator material is transmitted within said core.

2. An optical fiber comprises a core having lightwave guide property and extending along one direction,

a clad layer covering over a peripheral surface of said core to make a light transmitted in said core shield within said core,

a detecting layer covering over a peripheral surface of said clad layer and

a scintillator material dispersed in said detecting layer and emitting light when radiation is applied, wherein at least a part of the light emitted when radiation is applied to said scintillator material is transmitted through said clad layer and within said core.

3. An optical fiber defined in claim 1, wherein said scintillator material is inorganic scintillator material.

4. An optical fiber defined in claim 2, wherein said scintillator material is inorganic scintillator material.

5. An optical fiber defined in claim 1, wherein said radiation is at least one radiation selected from the group consisting of X-ray, α-ray, β-ray, and γ-ray, and said scintillator material is emitted when any of X-ray, α-ray, β-ray, and γ-ray is applied.

6. An optical fiber defined in claim 2, wherein said radiation is at least one radiation selected from the group consisting of X-ray, α-ray, β-ray, and γ-ray, and said scintillator material is emitted when any of X-ray, α-ray, β-ray, and γ-ray is applied.

7. An optical fiber defined in claim 1, wherein said optical fiber further includes a protective layer adapted to cover a peripheral surface of said clad layer.

8. An optical fiber defined in claim 2, wherein said optical fiber further includes a protective layer adapted to cover a peripheral surface of said detecting layer.

9. An optical fiber defined in claim 1, wherein said core is formed of quartz glass.

10. An optical fiber defined in claim 1, wherein said clad

layer is formed of transparent polymer synthetic resin.

11. An optical fiber defined in claim 1, wherein said scintillator material is dispersed in said clad layer by way of dope.

12. An optical fiber defined in claim 2, wherein said scintillator material is dispersed in said detecting layer by way of dope.

13. An optical fiber cable comprises: an optical fiber including; a core having lightwave guide property and extending along one direction; a clad layer covering over a peripheral surface of said core to make a light transmitted in said core shield within said core; and a scintillator material dispersed in said clad layer and emitting light when radiation is applied,

a radiation-shielding layer covering substantially over a periphery of said optical fiber, and

a gap located in at least one part of said radiation-shielding layer to enable radiation to be entered into said clad layer.

14. An optical fiber cable comprises: an optical fiber including; a core having lightwave guide property and extending along one direction; a clad layer covering over a peripheral surface of said core to make a light transmitted

in said core shield within said core; a detecting layer covering over a peripheral surface of said clad layer; and a scintillator material dispersed in said detecting layer and emitting light when radiation is applied,

a radiation-shielding layer covering substantially over a periphery of said optical fiber, and

a gap located in at least one part of said radiation-shielding layer to enable radiation to be entered into said detecting layer.

15. An optical fiber cable defined in claim 13, wherein said optical fiber further includes a reinforcing layer adapted to cover a peripheral surface of said optical fiber.

16. An optical fiber cable defined in claim 15, wherein said protective layer includes bunch of reinforcing fiber extending along said one direction.

17. An optical fiber cable defined in claim 16, wherein said reinforcing fiber is secured on a periphery of said optical fiber with a tape winded around a periphery of said bunch of reinforcing fiber.

18. An optical fiber cable defined in claim 14, wherein said optical fiber further includes a reinforcing layer adapted to cover a peripheral surface of said optical fiber.

19. An optical fiber cable defined in claim 18, wherein said protective layer includes bunch of reinforcing fiber extending along said one direction.

20. An optical fiber cable defined in claim 19, wherein said reinforcing fiber is secured on a periphery of said optical fiber with a tape winded around a periphery of said bunch of reinforcing fiber.

21. An optical fiber cable defined in claim 13, wherein said optical fiber further includes a reinforcing layer adapted to cover a peripheral surface of said optical fiber, and said radiation-shielding layer is adapted to cover a peripheral surface of said reinforcing layer.

22. An optical fiber cable defined in claim 21, wherein said tape is coated with lead, wherein said radiation-shielding layer formed of said winded tape.

23. An optical fiber cable defined in claim 14, wherein said optical fiber further includes a reinforcing layer adapted to cover a peripheral surface of said optical fiber, and said radiation-shielding layer is adapted to cover a peripheral surface of said reinforcing layer.

24. An optical fiber cable defined in claim 23, wherein said tape is coated with lead, wherein said radiation-shielding

layer formed of said winded tape.

25. An optical fiber cable defined in claim 13, wherein said gap is formed over the entire length in the circumferential direction of said optical fiber.

26. An optical fiber cable defined in claim 14, wherein said gap is formed over the entire length in the circumferential direction of said optical fiber.

27. An optical fiber cable defined in claim 13, wherein said gap is formed in plural parts of said radiation-shielding layer along said one direction with a predetermined space.

28. An optical fiber cable defined in claim 14, wherein said gap is formed in plural parts of said radiation-shielding layer along said one direction with a predetermined space.

29. An optical fiber cable defined in claim 13, wherein said optical fiber cable further includes a radiotransparant tegumentary layer adapted to cover over a periphery of said radiation-shielding layer with locating as the most outer layer.

30. An optical fiber cable defined in claim 14, wherein said optical fiber cable further includes a radiotransparant tegumentary layer adapted to cover over a periphery of said

radiation-shielding layer with locating as the most outer layer.

31. A radiation detecting system comprises an optical fiber cable adapted to emit light at a region where radiation is applied and transmitting the emitted light,

photoelectric conversion means connected to at least one end of said optical fiber cable, and

processing means detecting when radiation is applied in accordance with an output signal of said photoelectric conversion means.

32. A radiation detecting system defined in claim 31, wherein said radiation detecting system further includes an A/D conversion means between said photoelectric conversion means and said processing means to digitize said output signal.

33. A radiation detecting system defined in claim 31, wherein said photoelectric conversion means includes one input terminal to which one end of said optical fiber cable is connected.

34. A radiation detecting system defined in claim 33, wherein said optical fiber cable further includes a reflection means at another end of said optical fiber cable.

35. A radiation detecting system defined in claim 33, wherein

said another end of said optical fiber cable is opened.

36. A radiation detecting system defined in claim 31, wherein said photoelectric conversion means includes two input terminals to which both ends of said optical fiber cable are respectively connected.

37. A radiation detecting system defined in claim 31, wherein said optical fiber cable further includes at least one detect portion, wherein the light emitted at said detect portion when radiation is applied to said detect portion is transmitted within said optical fiber cable.

38. A radiation detecting system defined in claim 37, wherein said optical fiber cable further includes: an optical fiber having; an optical transmission core extending along one direction to transmit light emitted at said detect portion; a clad layer covering over a peripheral surface of said core; and a scintillator material dispersed in said clad layer and emitting light when radiation is applied,

a radiation-shielding layer covering substantially over a periphery of said optical fiber, wherein a gap is provided with locating in at least one part of said radiation-shielding layer as said detect portion.

39. A radiation detecting system defined in claim 37, wherein said optical fiber cable further includes: an optical fiber

having; an lightwave guide core extending along one direction to transmit light emitted at said detect portion; a clad layer covering over a peripheral surface of said core to make a light transmitted in said core shield within said core; a detecting layer covering over a peripheral surface of said clad layer, a scintillator material dispersed in said detecting layer and emitting light when radiation is applied, and

a radiation-shielding layer covering substantially over a periphery of said optical fiber, wherein a gap is provided with locating in at least one part of said radiation-shielding layer as said detect portion.

40. A radiation detecting system defined in claim 38, wherein said optical fiber cable further includes a reinforcing layer adapted to cover a peripheral surface of said optical fiber.

41. A radiation detecting system defined in claim 40, wherein said radiation-shielding layer includes bunch of reinforcing fiber extending along said one direction.

42. A radiation detecting system defined in claim 41, wherein said reinforcing fiber be secured on a periphery of said optical fiber with a tape winded around a periphery of said bunch of reinforcing fiber.

43. A radiation detecting system defined in claim 39, wherein

said optical fiber cable further includes a reinforcing layer adapted to cover a peripheral surface of said optical fiber.

44. A radiation detecting system defined in claim 43, wherein said radiation-shielding layer includes bunch of reinforcing fiber extending along said one direction.

45. A radiation detecting system defined in claim 44, wherein said reinforcing fiber be secured on a periphery of said optical fiber with a tape winded around a periphery of said bunch of reinforcing fiber.

46. A radiation detecting system defined in claim 38, wherein said radiation-shielding layer is adapted to cover a peripheral surface of said reinforcing layer.

47. A radiation detecting system defined in claim 46, wherein said radiation-shielding layer is formed by winding a tape coated with lead.

48. A radiation detecting system defined in claim 39, wherein said radiation-shielding layer is adapted to cover a peripheral surface of said reinforcing layer.

49. A radiation detecting system defined in claim 48, wherein said radiation-shielding layer is formed by winding a tape coated with lead.

50. A radiation detecting system defined in claim 38, wherein said gap is formed over the entire length in the circumferential direction of said optical fiber.

51. A radiation detecting system defined in claim 39, wherein said gap is formed over the entire length in the circumferential direction of said optical fiber.

52. A radiation detecting system defined in claim 38, wherein said gap is formed in plural parts of said radiation-shielding layer along said one direction with a predetermined space.

53. A radiation detecting system defined in claim 39, wherein said gap is formed in plural parts of said radiation-shielding layer along said one direction with a predetermined space.

54. A radiation detecting system defined in claim 38 through 36, wherein said optical fiber cable further includes a radiotransparant tegumentary layer is adapted to cover over a periphery of said radiation-shielding layer with locating as the most outer layer.

55. A radiation detecting system defined in claim 39, wherein said optical fiber cable further includes a radiotransparant tegumentary layer is adapted to cover over a periphery of

said radiation-shielding layer with locating as the most outer layer.

56. A radiation detecting system defined in claim 38, wherein said scintillator material is inorganic scintillator material.

57. A radiation detecting system defined in claim 56, wherein said scintillator material is dispersed in said clad layer by way of dope.

58. A radiation detecting system defined in claim 57, wherein said scintillator material is dispersed in said detecting layer by way of dope.

59. A radiation detecting system defined in claim 39, wherein said scintillator material is inorganic scintillator material.

60. A radiation detecting system defined in claim 59, wherein said scintillator material is dispersed in said clad layer by way of dope.

61. A radiation detecting system defined in claim 60, wherein said scintillator material is dispersed in said detecting layer by way of dope.

62. A radiation detecting system defined in claim 38, wherein said radiation is at least one radiation selected from said group consisting of X-ray, α-ray, β-ray, and γ-ray, and said scintillator material is emitted when any of X-ray, α-ray, β-ray and γ-ray is applied.

63. A radiation detecting system defined in claim 39, wherein said radiation is at least one radiation selected from said group consisting of X-ray, α-ray, β-ray, and γ-ray, and said scintillator material is emitted when any of X-ray, α-rayfc, β-ray and γ-ray is applied.

64. A radiation detecting system defined in claim 38, wherein said optical fiber cable further includes a protective layer adapted to cover a peripheral surface of said clad layer.

65. A radiation detecting system defined in claim 39, wherein said optical fiber cable further includes a protective layer adapted to cover a peripheral surface of said detecting layer.

66. A radiation detecting system defined in claim 38, wherein said core is formed of quartz glass.

67. A radiation detecting system defined in claim 39, wherein said core is formed of quartz glass.

68. A radiation detecting system defined in claim 38, wherein said clad layer is formed of transparent polymer synthetic resin.

69. A radiation detecting system defined in claim 39, wherein said clad layer is formed of transparent polymer synthetic resin.